

Date: Thursday, 10/19/2006 9:34:37 AM  
 User: Kim Johnston

## Process Sheet

Customer	: CU-DAR001 Dart Helicopters Services	Drawing Name	: 02.750 SUPPORT
Job Number	: 29073		
Estimate Number	: 10829		
P.O. Number	: N/A	Part Number	: D28931
This Issue	: 10/19/2006 S.O. No. : N/A	Drawing Number	: D2893 REV A1
Prsht Rev.	: NC	Project Number	: N/A
First Issue	: N/A	Drawing Revision	: A1
Previous Run	: 27475	Material	: N/A
	Type : MACHINED PARTS	Due Date	: 11/7/2006
Written By	: <u>HA 061019</u>	Qty:	8 Um: Each
Checked & Approved By	: <u>HA 061019</u>		
Comment	: Est: C 02.11.26 Reformat; Added P/O KJ est D 06.04.19 removed alodine EC		

## Additional Product

Job Number:



Seq. #:	Machine Or Operation:	Description :
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1.0

PG

PURCHASING



Comment: PURCHASING

Issue P/O: 2302C 06110120 (8)

Description: D6104-005

Material: 17-4 PH SS (AMS 5643 OR AISI 630) as per Dwg D6104

Material release note required.

2.0

D6104005

17-4 SS Roundbar 4.00"OD

QC6 BG 06.11.09 (8)

Comment: Qty.: 1.0000 Each(s)/Unit Total : 8.0000 Each(s)

Support

B 29073

3.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Recieve &amp; Inspect for Transit Damage

Ensure Material Release Note is attached

Rec'd 11/21 (8)

4.0

MORI SEIKI

MORI SEIKI CNC LATHE LARGE



Comment: MORI SEIKI CNC LATHE LARGE

Turn blank for Haas as per Folio FA081

BG 06.11.10 (8)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes ☒ No ☐ DQA: ED Date: 20/06/12/14  
 QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Date: Thursday, 10/19/2006 9:34:37 AM  
User: Kim Johnston

## Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: 02.750 SUPPORT

Job Number: 29073

Part Number: D28931

Job Number:



Seq. #:

Machine Or Operation:

Description :

5.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

36 06-11-10

(8)

6.0

HAAS1

HAAS CNC VERTICAL MACHINING #1



Comment: BAND SAW

Machine as per Folio FA081

Tumble & Deburr

5/3.6 06/11/28 16

7.0

QC2

INSPECT PARTS AS THEY COME OFF MACHINE



Comment: INSPECT ALL DIM TO DIM SHEET

5/3.6 06/11/28 16

8.0

QC8

SECOND CHECK



Comment: SECOND CHECK

J.F. 06/11/28 16

9.0

POWDER COATING

POWDER COATING



Comment: POWDER COATING

Powder Coat White Gloss (Ref: 4.3.5.1) as per QSI 005 4.3

m-h/a 06/12/12 (16)

10.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT

LB 06/12/13 (16)

11.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and Stock

Location: 5/166

LB 06/12/13 (16)

12.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

LB 06/12/14

Job Completion



LB 06/12/14

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b> 29073
<b>Description:</b> Ø2.750 Support	<b>Part Number:</b> D2893-1
<b>Inspection Dwg:</b> D2893 Rev. A1	<b>Page 1 of 1</b>

Inspect dimensions highlighted on inspection sheet drawing D2893 Rev A1/DSK078 Rev A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	1	2	3	4	By	Date
Lathe Section									
A	2.707	2.712		2.710	2.712	2.712	2.712	BC	06.11.10
B	4.946	4.966		4.956	4.956	4.956	4.956		
C	3.064	3.084		3.075	3.075	3.075	3.075		
D	0.718	0.738		.726	.726	.726	.726		
E	0.090	0.110		.103	.103	.103	.103		
F	2.934	2.954		2.946	2.946	2.946	2.946		
G	2.166	2.186		2.176	2.176	2.176	2.176		
H	3.890	3.910		3.900	3.900	3.900	3.900		
I	0.914	0.934		.924	.924	.924	.924		
J	0.022	0.042		.032	.032	.032	.032		
K	0.109	0.129		.118	.118	.118	.118		
L									
HAAS Section									
AA	2.985	3.005		2.998	2.997	2.996	2.998		
AB	0.440	0.460		0.455	0.448	0.444	0.444		
AC	0.125	0.160		0.134	0.127	0.141	0.127		
AD	0.040	0.060		0.048	0.048	0.044	0.049		
AE	0.188	0.193	DT8886	0.188	0.188	0.188	0.188		
AF	0.125	0.160		0.125	0.129	0.131	0.125		
AG	0.140	0.160		0.152	0.156	0.158	0.155		
AH	1.360	1.400		1.380	1.380	1.382	1.382		
AI	0.040	0.060		0.047	0.051	0.043	0.046		
AJ	1.190	1.230		1.215	1.223	1.223	1.224		
AK	0.010	0.020		0.015	0.015	0.015	0.015		
AL	0.053	0.073		0.063	0.063	0.063	0.063		
AM	0.240	0.260		0.250	0.250	0.250	0.250		
AN	2.518	2.538		2.528	2.528	2.528	2.528		
AO	84.39	90.39	DT8889	X	X	X	X		
AP	0.257	0.262	DT8883	0.257	0.257	0.257	0.257		
AQ	0.053	0.073		0.063	0.063	0.063	0.063		
AR									
AS									
Accept/Reject									

Measured by: BC / En
Date: 06/11/27

Audited by: J.L
Date: 06/11/27

Rev	Date	Change	Revised by	Approved
A	02.12.13	New Issue	KJ/RF	J

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b>	29073
<b>Description: Ø2.750 Support</b>	<b>Part Number:</b>	D2893-1
<b>Inspection Dwg: D2893 Rev. A1</b>		Page 1 of 1

Inspect dimensions highlighted on inspection sheet drawing D2893 Rev A1/DSK078 Rev A and record below:

				Recorded Actual Dimensions					
Dim	Min	Max	Go/No Go Gauge	15	26	37	48	By	Date
Lathe Section									
A	2.707	2.712		2.712	2.712	2.712	2.712	36	06.11.10
B	4.946	4.966		4.956	4.956	4.956	4.956		
C	3.064	3.084		3.074	3.074	3.074	3.074		
D	0.718	0.738		.726	.726	.726	.726		
E	0.090	0.110		.102	.102	.102	.102		
F	2.934	2.954		2.944	2.944	2.944	2.944		
G	2.166	2.186		2.173	2.173	2.173	2.173		
H	3.890	3.910		3.900	3.900	3.900	3.900		
I	0.914	0.934		.924	.924	.924	.924		
J	0.022	0.042		.032	.032	.032	.032		
K	0.109	0.129		.118	.118	.118	.118		
L									
HAAS Section									
AA	2.985	3.005		2.999	2.999	2.999	2.998		
AB	0.440	0.460		0.447	0.455	0.452	0.450		
AC	0.125	0.160		0.132	0.129	0.131	0.138		
AD	0.040	0.060		0.053	0.045	0.045	0.048		
AE	0.188	0.193	DT8706	0.189	0.189	0.189	0.189		
AF	0.125	0.160		0.132	0.125	0.126	0.123		
AG	0.140	0.160		0.155	0.152	0.152	0.151		
AH	1.360	1.400		1.382	1.383	1.381	1.383		
AI	0.040	0.060		0.050	0.047	0.052	0.051		
AJ	1.190	1.230		1.221	1.222	1.225	1.222		
AK	0.010	0.020		0.015	0.015	0.015	0.015		
AL	0.053	0.073		0.063	0.063	0.063	0.063		
AM	0.240	0.260		0.250	0.250	0.250	0.250		
AN	2.518	2.538		2.528	2.528	2.528	2.528		
AO	84.39	90.39	DT8699	✓	✓	✓	✓		
AP	0.257	0.262	DT8683	0.259	0.259	0.259	0.259		
AQ	0.053	0.073		0.063	0.063	0.063	0.063		
AR									
AS									
Accept/Reject									

Measured by:	361 CN/3.6
Date:	06/11/28

Audited by:	J.F.
Date:	06/11/28

Rev	Date	Change	Revised by	Approved
A	02.12.13	New Issue	KJ/RF	✓

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries





**VALBRUNA****SLATER STAINLESS, INC.**

2400 Taylor Street West, P.O. Box 630  
 Fort Wayne, Indiana USA 46801  
 Phone: 260-434-2892 Fax: 260-434-2905

**Product Certification Report****Report Number: 4213510****Certified on Aug 29, 2006 Page 1 of 2**

Order I.D. <b>0600410 001</b>		Order Date <b>2/14/06</b>		Commodity Code <b>14996</b>	
Dim 1 <b>4.0000</b>	Dim 2 <b>.0000</b>	Dim 3 <b>.0000</b>	Heat I.D. <b>042620</b>	Customer I.D. <b>001123</b>	Customer Purchase Order <b>01-12439</b>
Product Shape <b>Rounds</b>			Product Surface <b>Centerless Ground/Cold Finish</b>		Customer Grade <b>17-4</b>
Length (inches) <b>132.000 Min. 156.000 Max.</b>			Bill of Lading # <b>403806</b>	Weight	

**Ship To**

**CASTLE METALS**  
**3400 NORTH WOLF ROAD**  
**FRANKLIN PARK, IL 60131**

**Sold To**

**VALBRUNA STAINLESS, INC.**  
**2400 TAYLOR STREET WEST**  
**FORT WAYNE, IN 46802**

**Lifts: 0025 0030**

**AISI 630**  
**UNS S17400**  
**AMS 2303E**

**CONDITION A**  
**ASTMA 564-04**  
**AMS 5643Q**

3174-03 Rev 18 DTD 07/15/05  
 ASMESA 564 01 ED 2002 ADD

**CHEMICAL ANALYSIS**

C	Mn	P	S	Si	Cr	Ni	Mo	Cu	N	Cb	Ta	Cb+Ta
.040	.55	.022	.026	.38	15.80	4.33	.21	3.33	.04	.28	.010	.29

**HB****361****TENSILE PROPERTIES CAPABILITY**

HB	TS (PSI)	.2%YS (PSI)	%EL(2")	%RA	AGE(F)
430	205000	193300	12.9	54.6	900

**MAGNETIC PARTICLE TEST****FREQ SEV****AVG .20 .13****PRODUCTION HEAT TREATMENT**

SOL-ANN(F)	SOL-ANN(HR)	QUENCH
1900	7.75	Air

**MACRO ASTM E340/E381****MACRO****OK****OK****OK****PERCENT FERRITE****% FERRITE****AVG .5****Reduction ratio 5 To 1 Min.****Electric Furnace melted; AOD refined.****Ultrasonic test OK.**

We certify that the contents of this report are correct and that all operations performed by our company or subcontractors are in compliance with material specifications and the ASME Boiler & Pressure Code, Section III, Section III, Subsection NCA-3800, 2001 edition. 02 Addenda  
 Chemical testing performed to one or several of the following ASTM methods: E415, E572, E1019, E1085, E1086.

Results relate only to the items tested. Certification shall not be reproduced except in full, without written approval of Valbruna Stainless Inc. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal law, Title 18, Chapter 47. Consult material safety data sheet (MSDS) for hazard info.  
 I hereby certify that the reported figures are correct as contained in the records of the corporation.

Manager Laboratory Services

*Dennis Hackett*  
 Dennis Hackett

**CASTLE METALS FP**  
**DATE REC'D 8-29-06 JAC**  
**APPROVED BY Jf**  
**14996**

**VALBRUNA****SLATER STAINLESS, INC.**

2400 Taylor Street West, P.O. Box 630  
 Fort Wayne, Indiana USA 46801  
 Phone: 260-434-2892 Fax: 260-434-2905

**Product Certification Report****Report Number: 4213510**

Certified on Aug 29, 2006 Page 2 of 2

Order I.D. <b>0600410 001</b>		Order Date <b>2/14/06</b>		Commodity Code <b>14996</b>	
Dim 1 <b>4.0000</b>	Dim 2 <b>.0000</b>	Dim 3 <b>.0000</b>	Heat I.D. <b>042620</b>	Customer I.D. <b>001123</b>	Customer Purchase Order <b>01-12439</b>
Product Shape <b>Rounds</b>			Product Surface <b>Centerless Ground/Cold Finish.</b>		Customer Grade <b>17-4</b>
Length (Inches) <b>132.000 Min. 156.000 Max.</b>			Bill of Lading # <b>403806</b>	Weight	

**Ship  
To**

**CASTLE METALS**  
**3400 NORTH WOLF ROAD**  
**FRANKLIN PARK, IL 60131**

**Sold  
To**

**VALBRUNA STAINLESS, INC.**  
**2400 TAYLOR STREET WEST**  
**FORT WAYNE, IN 46802**

No mercury or low melting alloy contamination. No weld repair.

Material melted and manufactured in the United States.

Material conforms to listed specifications.

Quality system is compliant with ISO 9001:2000. Produced in accordance with EN 10204 3.1B.

Results relate only to the items tested. Certification shall not be reproduced except in full, without written approval of Valbruna Stainless Inc. The recording of false, fictitious, or fraudulent statements on this document may be punished as a felony under federal statutes, including Federal law, Title 18, Chapter 47. Consult material safety data sheet (MSDS) for hazard info. I hereby certify that the reported figures are correct as contained in the records of the corporation.

Manager Laboratory Services

*Dennis Hackett*

Dennis Hackett


 SYRACUSE  
NEW YORK 13201

# CERTIFICATE OF TEST

A M CASTLE, INC

S  
H  
I  
P  
T  
O

A M CASTLE, INC

OUR ORDER NO  
PS-16975-3-

3400 N WOLF RD

FRANKLIN PARK, IL 60131

6501 BINGLE STREET

HOUSTON, TX 77092

03 DATE  
04/30/04

CUSTOMER ORDER # &amp; DATE

21-22445

CUSTOMER REQ. #

DISTRICT

B PARSONS

SHIPPED  
FROM

SYRACUSE

DESCRIPTION OF MATERIAL

CRU 17CR 4NI RTA IAC 42470

SIZE

3.250 RD

3174-10 REV 4 ASME-SA564-98ED T630 ASTM-A564-02 T630

AMS-5643Q (EX SURFACE) AISI 630 UNS #S17400

HEAT NO.

CHEMICAL ANALYSIS

HEAT NO.	C	MN	P	S	SI	NI	CR	MO	CU	CO	TA
A15389	.047	.63	.025	.021	.55	4.16	15.20	.094	3.23	.29	.010

CASTLE METALS HOU

DATE REC'D 5-13-04

REC'D FROM Crucible

IAC 42470 RD 33843

APPROVED BY [Signature]

QUANTITY

HEAT NO.

MECHANICAL PROPERTIES

QUANTITY	HEAT NO.	TENSILE PSI	YLD. 2% PSI	%ELONG 2IN	RED/AREA%	HARDNESS BHN 348
2021 #	A15389	195,980	172,890	13.6	50.0	BHN 388

CAPABILITY PHYSICALS AFTER 900 DEG. F. - 1 HR. AIRCOOL:

MACRO TEST OK

FERRITE 5 %

MAGNAFLUX F/S = 0/0

REDUCTION RATIO: 27.5:1

ELECTRIC FURNACE AOD MELTED

MATERIAL SOLUTION TREATED AT 1900 DEG. F. HELD 45 MINUTES AT TEMPERATURE -

AIRCOOLED.

CRUCIBLE MATERIALS CORP. VENDOR #18610.

MATERIAL INGOT CAST.

NAFTA - YES

 MATERIAL FREE FROM MERCURY CONTAMINATION AT TIME OF SHIPMENT  
 NO WELD REPAIR PERFORMED  
 MATERIAL MELTED IN U.S.A.

 THANK YOU FOR SELECTING A QUALITY PRODUCT  
 MANUFACTURED BY THE EMPLOYEES OF CRUCIBLE SPECIALTY METALS JU

SWORN TO AND SUBSCRIBED BEFORE ME THIS

DAY OF 20

NOTARY PUBLIC

JACKIE L WHITE - SPECIFICATION EXAMINER

 THE ABOVE MATERIAL WAS MANUFACTURED AND TESTED IN ACCORDANCE  
 WITH ABOVE SPECIFICATIONS AND IS IN CONFORMANCE WITH THE  
 SPECIFICATION REQUIREMENTS.

 CRUCIBLE MATERIALS CORPORATION  
 ACTING BY AND THROUGH ITS SPECIALTY METALS DIVISION  
 [Signature]  
 QUALITY ASSURANCE REPRESENTATIVE

 CERTIFIED  
 BY: